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Technisches Handbuch / Technical Manual

Mainboard D1419

Deutsch / English



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Technisches Handbuch
Technical Manual

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Contents

Introduction.....	1
Notational conventions	1
Important notes.....	1
Information about boards	2
Features	3
Interfaces and connectors.....	4
Temperature / System monitoring.....	5
LAN connector.....	6
ISA bus resources	6
PCI bus resources	7
PCI slots	7
PCI IRQ line x - Assignment of the PCI interrupts.....	7
Screen resolution.....	8
SCSI/Host RAID configuration utility.....	9
Starting the SCSI/Host RAID configuration program	9
Terminating the SCSI/Host RAID configuration program.....	9
Activating and Configuring Host RAID	10
Default Settings in the menu Configure/View SCSI Controller Settings.....	11
SCSI Bus Interface Definitions.....	12
Additional Options.....	12
SCSI Device Configuration	13
Advanced Configuration Options.....	14
SCSI Disk Utilities.....	15
Verify	15
Format Disk	15
Settings with switches	16
Recovering System BIOS - switch 1	16
Skipping the password query - switch 2	16
Write protection for Flash BIOS - switch 3	16
Write protection for floppy disks - switch 4	16
Add-on modules	17
Slot sequence.....	18
Installing the processor with heat sink and fan.....	19
Mounting heat sink.....	19
Upgrading main memory.....	20
Replacing lithium battery.....	22
Glossary	23

Introduction

This technical manual describes the mainboard D1419, which can be equipped with up to two Intel processors.

You will find further information in the "BIOS Setup" description.

Further information about drivers is provided in the readme files on the hard disk, on the supplied drivers diskettes, on the "Drivers & Utilities" or on the "ServerStart" CD.

Notational conventions

The meanings of the symbols and fonts used in this manual are as follows:



Pay particular attention to text marked with this symbol. Failure to observe this warning endangers your life, destroys the device, or may lead to loss of data.



Supplementary information, remarks, and tips follow this symbol.

- ▶ Text which follows this symbol describes activities that must be performed in the order shown.
- ␣ This symbol indicates that you must enter a blank space (press the Space Bar) at this point.
- ↵ This symbol indicates that you must press the Enter key.

Text in this typeface indicates screen outputs.

Text in this bold typeface indicates the entries you make via the keyboard.

Text in italics indicates commands or menu items.

"Quotation marks" indicate names of chapters or terms.

Important notes

With the mainboard installed you must open the system to access the mainboard. How to dismantle and reassemble the system is described in the operating manual accompanying the system.

Connecting cables for peripherals must be adequately shielded to avoid interference.



Observe the safety notes in the operating manual of your system.

Incorrect replacement of the lithium battery may lead to a risk of explosion. It is therefore essential to observe the instructions in the "Add-on modules" - "Replacing lithium battery" section.

Components can become very hot during operation. Ensure you do not touch components when making extensions to the mainboard. There is a danger of burns!

Connecting cables for peripherals must be adequately shielded to avoid interference.



The shipped version of this board complies with the requirements of the EEC directive 89/336/EEC "Electromagnetic compatibility".

Compliance was tested in a typical PC configuration.

When installing the board, refer to the specific installation information in the operating manual or technical manual for the receiving device.

Connecting cables for peripherals must be adequately shielded to avoid interference.



Components can become very hot during operation. Ensure you do not touch components when making extensions to the mainboard. There is a danger of burns!



The warranty is invalidated if the device is damaged during the installation or replacement of system expansions. Information on which system expansions you can use is available from your sales outlet or the customer service centre.

Information about boards

To prevent damage to the mainboard, the components and conductors on it, please take great care when you insert or remove boards. Take great care to ensure that extension boards are slotted in straight, without damaging components or conductors on the mainboard, or any other components, for example EMI spring contacts.

Remove the plug from the mains outlet so that system and mainboard are totally disconnected from the mains voltage.

Be careful with the locking mechanisms (catches, centering pins etc.) when you replace the mainboard or components on it, for example memory modules or processors.

Never use sharp objects (screwdrivers) for leverage.



Boards with electrostatic sensitive devices (ESD) are identifiable by the label shown.

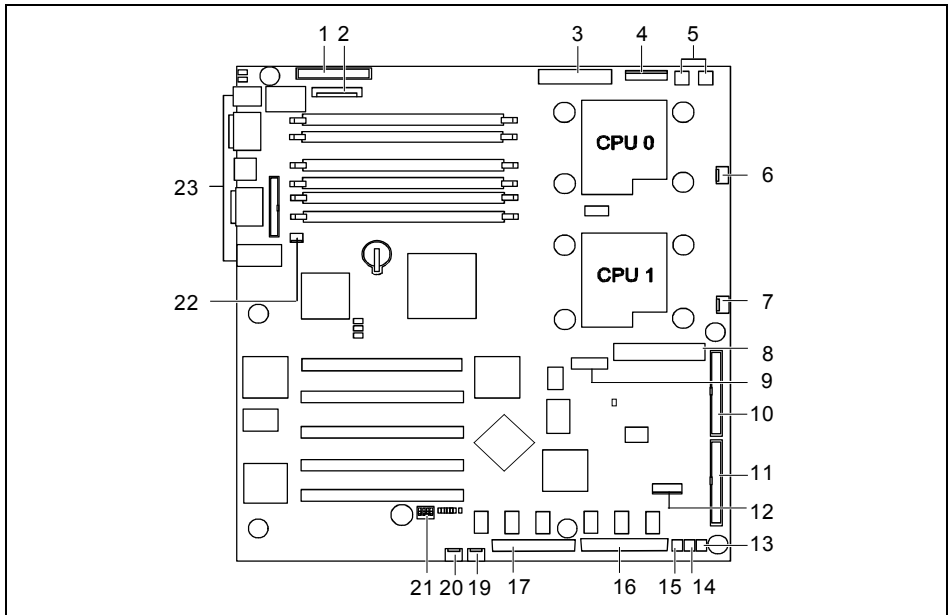
When you handle boards fitted with ESDs, you must, under all circumstances, observe the following:

- You must always discharge static build up (e.g. by touching a grounded object) before working.
- The equipment and tools you use must be free of static charges.
- Remove the power plug from the mains supply before inserting or removing boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.

Features

- ServerWorks GC LE533 chipset
- two processor sockets for Prestonia or Nocona processors with 2.2 GHz and higher, socket 604, with 133 MHz Front Side Bus and quad pumped data bus
- 512 Kbyte second level cache
- 6 slots for main memory. PC2100 modules (registered DDR DIMM memory modules with 266 MHz and ECC) for 256 Mbyte up to 12 Gbyte main memory
- one 64 bit PCI-X slot with 100/133 MHz
- two 64 bit PCI-X slots with 100 MHz
- one 64 bit PCI-X slot with 100 MHz (prepared for ZCR)
- one 64 bit PCI slot with 33 MHz (long design possible)
- SCSI controller AIC7902 Ultra 320 capable, two-channel; board supports Zero Channel RAID (with Host RAID function)
- Screen controller ATI Rage XL VGA onboard with 230 MHz RAMDAC and 8 Mbyte SDRAM memory
- Broadcom BMC5703C single channel GbE Ethernet LAN controller
- Server management with BMC (FSC system) onboard
- two IDE interfaces ATA100 capable, support PIO mode 0-4
- Floppy port (34 pin classical for TX200 and 26 pin fineprint for RX300)
- one external parallel interface (ECP- and EPP-compatible)
- two external serial ports (COM1 and COM2)
- two external and two internal USB1.1 ports
- one external RJ45 LAN port
- two external PS/2 interfaces for keyboard and mouse
- system monitoring

Interfaces and connectors



1 = Floppy disk drive (TX300)
 2 = Floppy disk drive (RX300)

3 = Power supply ATX

4 = PC98

5 = Power supply 12 V

6 = Fan connector for CPU 0

7 = Fan connector for CPU 1

8 = Control panel

9 = USB ports 2 / 3

10 = IDE drives (primary)

11 = IDE drives (secondary)

12 = IPMB

13 = Connector NMI key

14 = Reset

15 = Cover monitoring

16 = SCSI channel B

17 = SCSI channel A

18 = Switch block

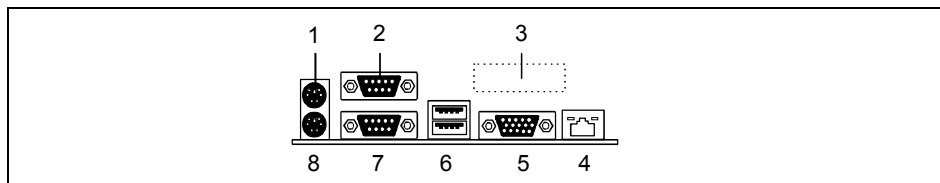
19 = Fan 2 (system)

20 = Fan 1 (system)

21 = RSB (Remote Service Board) power supply

22 = External ports

External ports



1 = PS/2 mouse port

2 = Serial port COM2

3 = Parallel port LPT

4 = LAN connector

5 = VGA port

6 = USB ports (2x)

7 = Serial port COM1

8 = PS/2 keyboard port

The components and connectors marked are not necessarily present on the mainboard.

Temperature / System monitoring

Temperature and system monitoring aim to reliably protect the computer hardware against damage caused by overheating. In addition, any unnecessary noise is also prevented by reducing the fan speed, and information is provided about the system status. Cover monitoring protects the system from unauthorized opening.

The temperature and system monitoring are controlled by an onboard controller developed by Fujitsu Siemens.

The following functions are supported:

Temperature monitoring:

Measurement of the processor temperature, measurement of the system temperature with an onboard temperature sensor, measurement of the ambient temperature with a temperature sensor.

Fan monitoring:

Fans that are no longer available, blocked or sticky fans are detected. Blocked or sticky fans are operated with 12 V pulse voltage. Fans removed while the system is switched off are signaled by the *Display news* LED when the system is switched on again and processed by the BIOS or the application.

Fan control:

The fans are regulated according to temperature.

Sensor monitoring:

The removal of, or a fault in, a temperature sensor is detected. Should this happen all fans monitored by this sensor run at maximum speed, to achieve the greatest possible protection of the hardware. Temperature sensors removed while the system is switched off are signaled by the *Display news* LED and processed by the BIOS or the application.

Cover monitoring:

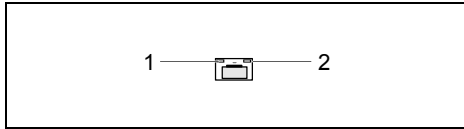
Unauthorized opening of the cover is detected, even when the system is switched off. However, this will only be indicated when the system is switched on again.

LAN connector

This mainboard has a BCM5703C from Broadcom. This LAN controller supports the transfer rates of 10 Mbit/s, 100 Mbit/s and 1 Gbit/s. The LAN controller is equipped with a 512 byte transmission and receiving buffer (FIFO) and supports WOL function through Magic Packet™.

It is also possible to boot a device without its own boot hard disk via LAN. Here Broadcom PXE is supported.

The LAN RJ45 connector is equipped with an orange/green and a green LED (light emitting diode).



- 1 = Orange/green indicator
- 2 = Green indicator

Green LAN activity

Orange/green LAN speed.

off: 10 Mbit/s or no connection

Green: 100 Mbit/s

Orange: 1 Gbit/s

ISA bus resources

Device	IRQ	Address	DMA
Keyboard	1	060, 064	
Serial port COM2	3	03F8, 02F8 , 03E8, 02E8	
Serial port COM1	4	03F8 , 02F8, 03E8, 02E8	
	5		
Floppy disk drive controller	6	03F0-3F5, 3F7	2
Parallel interface LPT1	7	0278, 0378, 03BC	0, 1, 3
Real-time clock (RTC)	8	070-071	
free	9, 10, 11		
Mouse controller	12		
Numeric processor	13	0F0-0FE	
IDE controller	14	1F0-1F7	
free	15		

"IRQ" = interrupt assigned as shipped

"Address" = this address can be used for your particular device

"Address" = this DMA can be used for your particular device

Default settings are shown in bold print.

PCI bus resources

PCI slots

The following table shows an overview of the PCI slots:

PCI slot	64bit/32bit	Frequency in MHz	PCI-X	Description
1	64 bit	100/133	yes	64 bit PCI bus slot
2	64 bit	100	yes	64 bit PCI bus slot
3	64 bit	100	yes	64 bit PCI bus slot, prepared for ZCR (= Zero Channel RAID)
4	64 bit	100	yes	64 bit PCI bus slot, prepared for riser card E313
5	64 bit	33	no	64 bit PCI bus slot

PCI IRQ line x - Assignment of the PCI interrupts

PCI IRQ Line x defines which ISA interrupts are used for the separate PCI slots.

If you select *Auto* in the BIOS setup, the interrupts are assigned automatically and no further settings are required.

Multifunctional PCI boards or boards with an integrated PCI-to-PCI bridge can use several PCI interrupts (INTA#, INTB#, INTC#, INTD#). Monofunctional PCI boards (default) only use one PCI interrupt (INTA#) per PCI slot.

The PCI interrupts INTA#, INTB#, INTC# and INTD# are available for each PCI slot, however only 2 are routed further for PCI slot 5, as A and C as well as B and D are interrelated.

The same interrupt can be assigned simultaneously to several PCI boards. You should avoid this condition due to reduced performance.

If you use a setting other than *Auto*, the Plug&Play functionality of the system BIOS for the corresponding PCI boards is deactivated.

Auto The PCI interrupts are assigned automatically in accordance with the Plug&Play guidelines.

Disabled No ISA interrupt is assigned to the PCI interrupt.

3, 4, 5, 6, 7, 9, 10, 11, 12, 14, 15

The selected ISA interrupt is assigned to the PCI interrupt. You may not select an ISA interrupt that is used by a component on the mainboard (e.g. controller) or an ISA board.

	A	B	C	D
Slot 1	PCI IRQ line 4	PCI IRQ line 5	PCI IRQ line 6	PCI IRQ line 7
Slot 2	PCI IRQ line 6	PCI IRQ line 7	PCI IRQ line 4	PCI IRQ line 5
Slot 3	PCI IRQ line 8	PCI IRQ line 9	PCI IRQ line 10	PCI IRQ line 11
Slot 4	PCI IRQ line 12	PCI IRQ line 13	PCI IRQ line 14	PCI IRQ line 15
Slot 5	PCI IRQ line 0	PCI IRQ line 1	PCI IRQ line 0	PCI IRQ line 1
VGA	-	-	-	-
SCSI*	PCI IRQ line 10	PCI IRQ line 11		
LAN**	PCI IRQ line 2	-	-	-
USB	-	-	-	-

A..D = Interrupt output of the PCI controller

* : Interrupts of SCSI channel A respective B.

** : LAN interrupts are not PCI specific.

Screen resolution

Depending on the operating system used the screen resolutions in the following table refer to the screen controller on the mainboard. If you are using an external screen controller, you will find details of supported screen resolutions in the operating manual or technical manual supplied with the controller.

Screen resolution	Refresh rate (Hz)	Max. number of colors
640x480	200	16.7 mio.
800x600	200	16.7 mio.
1024x768	150	16.7 mio.
1152x864	120	16.7 mio.
1280x1024	100	16.7 mio.
1600x1200	75	16.7 mio.

Shaded screen resolutions are not supported by LCD monitors (TFT).

SCSI/Host RAID configuration utility

The BIOS of the onboard U320 SCSI controller includes a menu-driven SCSI/Host RAID configuration program. This program allows you to change almost all of the option settings of the SCSI controller.

When you boot the system a SCSI/Host RAID-BIOS message listing the SCSI devices connected is displayed.



If an SCSI/Host RAID-BIOS error message appears or problems arise with SCSI devices, please read the documentation of your SCSI device.

If you are unable to trace or rectify the error, please contact your dealer or our customer service centre.

Working with the keyboard

Use the following keys when running the program:



to make selections



to accept a selection



to call the previous menu and to terminate the SCSI configuration program.



to reset to the default settings. This function is not possible in all menus.

Starting the SCSI/Host RAID configuration program

- ▶ Start the PC, if the following message appears, press the key combination **Ctrl** and **A** :

Press <Ctrl> <A> for SCSI Select (TM) Utility!

In the first menu the available U320 SCSI controller are displayed. The onboard SCSI controller of D1419 is displayed with the following entry:

AIC-7902 at slot 00 00:04:00

When choosing the AIC-7902 you are taken to the top level of the configuration menu of this controller. The following options cannot be displayed.

Host RAID is disabled (default):

Configure/View SCSI Controller Settings

SCSI Disk Utilities

Enable Host RAID Support

Host RAID is enabled:

Configure/View SCSI Controller Settings

Configure/View Host RAID Settings

SCSI Disk Utilities

Disable Host RAID Support

Terminating the SCSI/Host RAID configuration program

Depending on the current menu level, you can display the previous menu by pressing the **ESC** key. If you have made changes in the current menu you will be prompted to store them.

- ▶ To quit the Configuration program press the **ESC** key until a corresponding message is displayed. Select *Yes* to quit.

Activating and Configuring Host RAID

To configure *Host RAID* select the menu entry *Configure/View Host RAID Settings*. If this entry is not displayed you have to activate *Host RAID* with the entry *Enable Host RAID Support*.

Now the existing SCSI hard disks and already configured RAID drives are displayed.

Select one of the displayed hard disks and configure the RAID-System to your needs.



Detailed instruction on the configuration of Host RAID are contained in the Host RAID User's Guide.

The administration of the RAID system can be set later by a tool in your operating system (see therefor the documentation "Storage Manager Browser Edition"). this tool currently is available for Windows NT4 and Windows 2000.

Default Settings in the menu Configure/View SCSI Controller Settings

SCSI Bus Interface Definitions	Default setting
SCSI Controller ID	7
SCSI Controller Parity	Enabled
SCSI Controller Termination	Enabled
Additional Options	Default setting
Boot Device Configuration	Press <Enter>
Single Image	
Master SCSI Controller	AIC-7902 at slot 00 00:04:00
Select SCSI peripheral from which to boot	
Boot SCSI Controller	AIC-7902 at slot 00 00:04:00
Boot SCSI ID	0
Boot LUN number*	0
SCSI Device Configuration	Press <Enter>
Sync Transfer Rate (MB/Sec)	320
Packetized	Yes
QAS	Yes
Initiate wide negotiation	Yes (Enabled)
Enable disconnection	Yes (Enabled)
Send Start Unit Command****	Yes
BIOS Multiple LUN Support	No
Include in BIOS Scan	Yes
Advanced Configuration	Press <Enter>
Reset SCSI Bus at IC Initialization	Enabled
Display <Ctrl><A> Message During BIOS Initialization	Enabled
Extended Int 13 Translation for DOS Drives > 1Gbyte	Enabled
POST Display Mode	Verbose
SCSI Controller Int 13 Support	Enabled
Domain Validation****	Enabled
Support Removable Disks Under Int 13as Fixed Disks****	Disabled
BIOS Support for Bootable CD-ROM****	Enabled

* The setting is valid only if *Multiple LUN Support* is *enabled*.

**** The setting is valid only if the Int 13 Support of the SCSI controller is enabled (*Enabled*).

SCSI Bus Interface Definitions

SCSI Controller ID

All SCSI devices on one SCSI bus, including the SCSI controller, must be set to separate SCSI addresses.

The SCSI controller is normally set to ID 7.

You do not normally need to change the SCSI address, not even if you install several SCSI controllers. In this case each SCSI controller may be assigned address 7, because each is connected to its own SCSI bus.

SCSI Controller Parity

The U320-SCSI controller uses parity bits on the SCSI bus to verify the data transfer from your SCSI bus (*Enabled*).

If one of your SCSI devices does not support *Parity Checking*, disable it on the SCSI controller.

SCSI Controller Termination

The terminating resistors of the SCSI controller must be enabled.



The default setting is *Enabled*. The terminating resistor of the SCSI controller is enabled. With **F6** you can reset to the default setting.

Additional Options

Master SCSI Controller

These settings display from which of the available SCSI controller the BIOS is loaded. As long as the onboard SCSI controller AIC-7902 is activated, only this one is the master controller.

Boot SCSI Controller

This setting defines from which of the available SCSI controller is booted.

Boot Target ID

The U320-SCSI controller can start the operating system from a drive with any SCSI address (ID). The default setting is SCSI ID 0. The SCSI ID selected here must correspond to the ID configured on the boot device.

Boot LUN number

If your boot device has multiple LUNs (Logical Unit Numbers) and *Multiple LUN Support* is *Enabled*, this option allows you to specify which LUN to boot from on your boot device. The default setting is LUN 0.

SCSI Device Configuration

Sync Transfer Rate

Fast SCSI devices, including the U320-SCSI controller, are capable of transferring data to and from the SCSI bus at speeds ranging up to 320 Mbyte/s at synchronous data transfer. The configurable maximum data transfer rate is 320 Mbyte/s. For this setting the options "Wide Negotiation", "Packetized" and "Disconnection" must be activated (YES).

Packetized

When activating the packetized option for the U320 SCSI operation not only data but also SCSI commands and messages in synchronous operation are transferred. These are transferred together with data in packages. With this more bus bandwidth for real data transmission are available. This option is only for the U320 operation.

QAS

By the QAS (Quick Arbitration and Select) option the packages are transferred on the SCSI bus without a bus free phase between the packages. As a result a higher throughput on the SCSI bus is achieved. This option is only for the U320 operation.

Initiate wide negotiation

This option determines whether the SCSI controller attempts 16-bit data transfer (Wide negotiation) instead of 8-bit data transfer. As a result two byte are transferred simultaneously via the SCSI bus instead of one byte.

Enable disconnection

The default setting is *Yes* (enabled).

This permits SCSI devices to enable the SCSI bus during command execution.

A typical example of this is a tape device that has no need to access the SCSI bus during rewinding and can be "disconnected" from the SCSI bus for this period.

You can disable the function (*No*) if you have only connected one SCSI device. In this case, disabling disconnection improves performance slightly.

Send Start Unit Command

The default setting is *Yes* (enabled).

When this feature is enabled, the SCSI devices which support this function are not started by switching on the server until they receive a "Start Unit" command from BIOS of the U320 SCSI controller. (To do this the U320-SCSI controller BIOS must not be disabled).

This function is used to distribute the high starting currents of the SCSI devices over a specific period and to release the power supply of your server.

BIOS Multiple LUN Support

This option determines whether booting from a SCSI device that has multiple LUNs (Logical Unit Numbers) is supported. The default setting is *No* (disabled).

Include in BIOS Scan

With this setting it can be determined for every SCSI address on this SCSI bus, whether the SCSI BIOS while initializing checks or not that a SCSI device with this special address is connected to the bus. The default setting is *Yes*, i.e. the corresponding SCSI address is checked.

Advanced Configuration Options

Reset SCSI Bus at IC Initialization

The default setting is *Enabled*.

This causes a reset on the SCSI bus during the initialisation of the SCSI controller. All the devices connected to the SCSI bus are reset and re-initialised by that.

Display <CTRL><A> Message During BIOS Initialization

This option determines whether the

Press <Ctrl> <A> for SCSISelect (TM) Utility!

message appears on your screen during system startup. The default setting is *Enabled*.

If this setting is disabled, you can still invoke the SCSI configuration program by pressing **CTRL** and **A** at system bootup.

Extended Int 13 Translation for DOS Drives > 1Gbyte

The default setting is *Enabled*.

Normally, only drives with a capacity of up to 1 Gbyte can be accessed.

Enabling this option allows drives of up to 8 Gbyte capacity (2 Gbyte/partition) to be supported under MS-DOS 5.0 or higher.

The SCSI controller BIOS must be enabled. The drive must be controlled by the SCSI controller BIOS.



Back up the data on your large capacity drive before enabling the option.

After enabling this option, the drive must be re-partitioned and high-level formatted with the DOS *FDISK* and *FORMAT* programs.

Do not use this option with drives that contain two or more partitions formatted with different operating systems.

POST Display Mode

The default setting is *Verbose*.

While the system is booting, the SCSI controller's BIOS reports which devices are connected to the SCSI bus. Further settings are *Silent* (no messages are shown) and *Diagnostic* (additional information are shown for diagnostics purposes).

SCSI Controller Int 13 Support

The default setting for the Int 13 SCSI controller's support is *Enabled*. With this the SCSI controller's BIOS is enabled.

If you are only running SCSI devices, from which you don't want to boot and if you need space for the BIOS of additional controller, then you disable the Int 13 support of the U320-SCSI-controller.

When you disable the Int 13 support via the SCSI configuration program, you can retain access to the configuration program at system start-up with the **Ctrl** - **A** keys.



Note under DOS that you will have to install additional drivers to access drives if the Int 13 support of the U320-SCSI controller is disabled.

Domain Validation

The default setting is *Enabled*.

The SCSI controller checks with a short test, whether the transmission rate set under *Sync Transfer Rate* is possible. If errors occur, the transmission rate is reduced as far as no more errors occur.

Support Removable Disks under Int 13 as Fixed Disks

This option allows you to use removable-media drives, such as CD-ROM drives, without installing additional drivers. The default setting is *Disabled*.



If a removable-media device is controlled by the SCSI controller BIOS, do not remove the media while the PC is on.

BIOS Support for Bootable CD-ROM

This option determines whether the BIOS supports a CD-ROM drive startup drive, i.e. you can boot from CD-ROM. The default setting is *Enabled*.

SCSI Disk Utilities

When you select the *SCSI Disk Utilities* menu item, you are shown a list of all the devices connected to the SCSI bus. You are also offered two menus for hard disk drives: *Verify* and *Format Disk*.

Verify

With *Verify* you can have a selected hard disk drive checked. All defects that are detected will be entered in the existing error list for the hard disk.

Format Disk

With *Format Disk* a selected hard disk is formatted in low-level format. Normally hard disks are already formatted in low-level format. You should use this menu item only if you want to erase the hard disk completely and regenerate the error list.

Settings with switches



Preset for switches 1 to 4 = *Off*.
The clock frequency of the processor is set automatically.

Recovering System BIOS - switch 1

Switch 1 enables recovery of the old system BIOS after an attempt to update has failed. To restore the old system BIOS you need a Flash BIOS Diskette (please call our customer service centre).

on The system boots from the "Flash BIOS floppy disk" from Drive A and reprograms the system BIOS on the board.

off The System BIOS is started with the system BIOS from the mainboard (default setting).

Skipping the password query - switch 2

Switch 2 is used to define whether the password is queried at system startup, if the password protection is enabled in *BIOS Setup* (in *Security* menu, the *Password* field must be set to *Enabled*).

on The password query is skipped. Passwords are deleted.

off The password query is effective (default setting).

Write protection for Flash BIOS - switch 3

Switch 3 is used to define whether the System BIOS is write protected or not.

on The System BIOS can neither be written to nor deleted. Flash-BIOS update from floppy disk is not possible.

off The System BIOS can be written or deleted. Flash-BIOS update from floppy disk is possible (default setting).

Write protection for floppy disks - switch 4

Switch 4 is used to define whether floppy disks can be written or deleted in the floppy disk drive. To write and delete floppy disks, the write-protection in *BIOS Setup* must be disabled (in menu *Security*, the field *Diskette Write* must be set to *Enabled*).

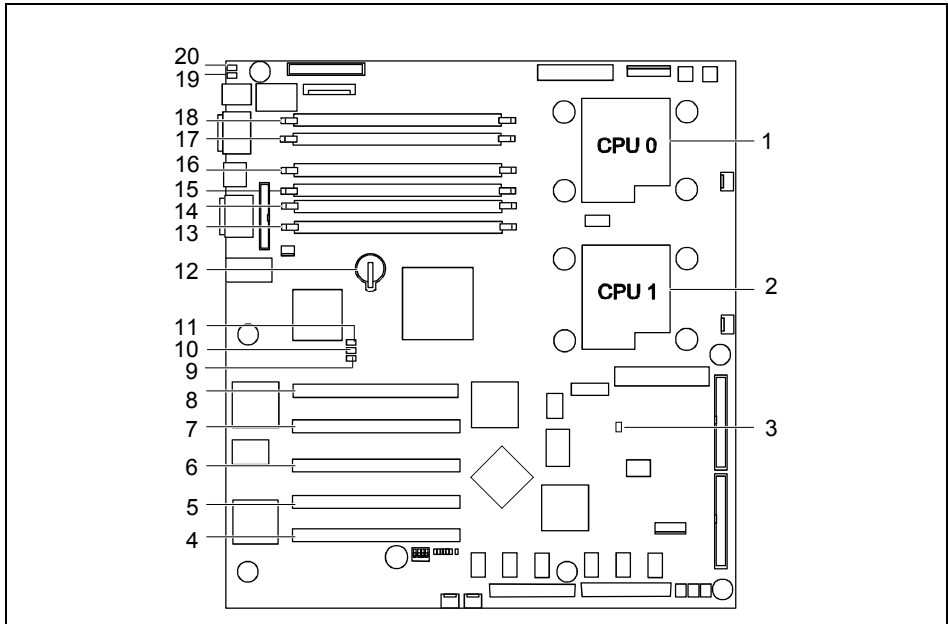
on The floppy disk drive is write-protected.

off Floppy disks can be read, written and deleted (default setting).

Add-on modules



For all steps described in this chapter pull the power plug out of the mains outlet!



- | | |
|---|---|
| 1 = Socket for processor 1 (CPU 0) | 11 = LED L1 (yellow): "Auxiliary voltage" |
| 2 = Socket for processor 2 (CPU 1) | 12 = Battery |
| 3 = Heartbeat-LED (blinking): "BMC is activated" | 13 = Memory bank 0, module A |
| 4 = PCI slot 1 | 14 = Memory bank 0, module B |
| 5 = PCI slot 2 | 15 = Memory bank 1, module A |
| 6 = PCI slot 3: Zero Channel RAID | 16 = Memory bank 1, module B |
| 7 = PCI slot 4 | 17 = Memory bank 2, module A |
| 8 = PCI slot 5 | 18 = Memory bank 2, module B |
| 9 = LED L3 (red): "Processor configuration error" | 19 = LED L5 (blue): identification display |
| 10 = LED L2 (green): "Operating voltage" | 20 = LED L4 (amber): Global error indicator |

LEDs	Normal operation	Another operating mode
Heartbeat LED (flashes): "BMC is activated" (indicates that the system monitoring function is active)	flashing	on/off: BMC is not working
LED L1 (yellow): "Auxiliary voltage"	on	off: no auxiliary voltage available
LED L2 (green): "Operating voltage"	on	off: no operating voltage available
LED L3 (red): "Processor configuration error"	off	on: processor configuration error
LED L4 (amber): Global error indicator	off	on: prefailure detected flashing: global error
LED L5 (blue): identification display	off	on: Device identification

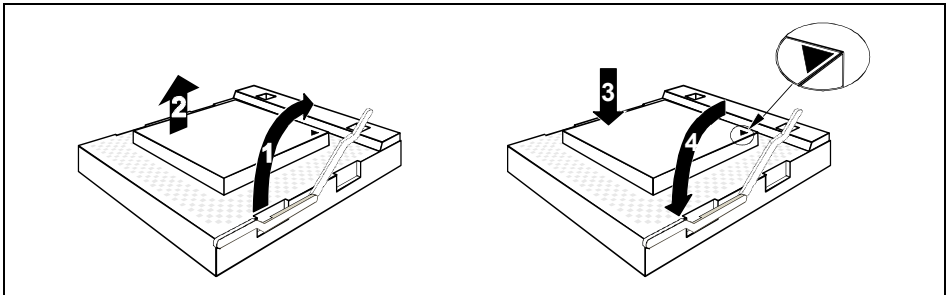
PCI slots 1, 2, 3 and 4 are 3.3 V slots. PCI slot 3 supports a Zero Channel RAID controller. The RSB can be mounted in PCI slot 5.

Slot sequence

- A "Zero Channel RAID Controller" board can only be mounted in PCI slot 3 to offer a RAID solution with the onboard RAID controller.
- A 5 V PCI card can only be mounted in PCI slot 5.

Installing the processor with heat sink and fan

- ▶ Remove the heat sink including the fan fixed upon it.



- ▶ Push the lever in the direction of the arrow (1) and lift it as far as it will go.
- ▶ Remove the old processor from the socket (2).
- ▶ Insert the new processor in the socket so that the angled corner of the processor matches the coding on the socket (A) with regard to the position (3).
- ▶ Push the lever back down until it clicks into place (4).

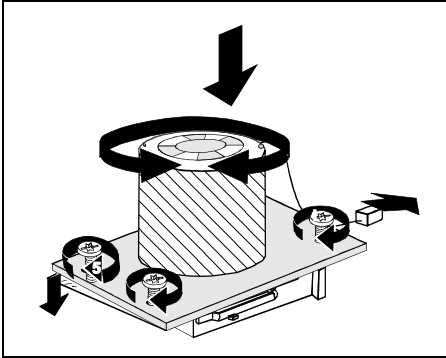
Mounting heat sink

If you are installing the heat sink you must ensure a good heat contact between heat sink and the processor's surface. It is essential to use heat conducting paste between the processor and the heat sink.

If you remove the heat sink, you must clean it (e.g. with benzine) and apply new heat conducting paste before you remount it.

Be sure to use heat conducting material between the processor and the heat sink. If a heat conducting pad (rubber-like foil) is already applied to the heat sink, then use it. Otherwise you must apply a very thin layer of heat conducting paste.

Heat conducting pads can only be used once. If you remove the heat sink, you must clean it and apply new heat conducting paste before you remount it.



When using a new heat sink:

- ▶ Remove the protection cover from the underside of the heat sink.

When using the previous heat sink:

- ▶ Completely remove the old residues of the heat conducting paste.
- ▶ Apply an even coat of heat conducting paste to the entire surface of the processor and mount the heat sink on it.
- ▶ Fix the heat sink with the supplied screws.
- ▶ Connect the end of the fan cable to the connector on the mainboard.

Upgrading main memory

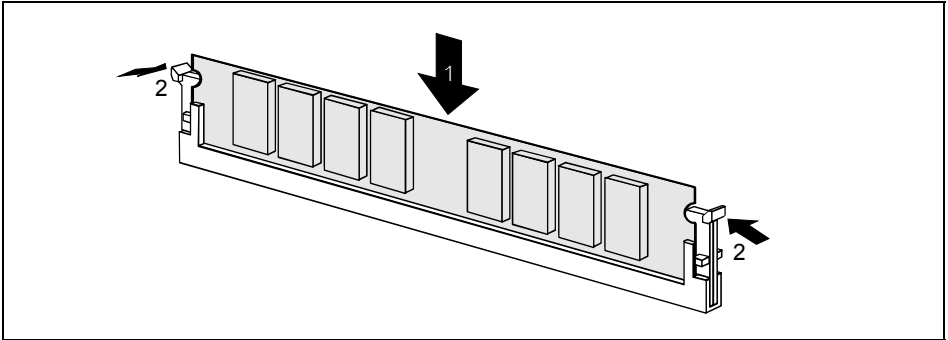
The slots for the main memory are suitable for 256, 512, 1024 and 2048 Mbyte DDR-DIMM memory modules. The organization in three memory banks 0 to 2 enables fast memory access with interleave. The board supports a maximum of 12 Gbytes.

Two identical memory modules must be installed per memory bank. Partial equipping of a memory bank is not possible. The equipping sequence of the memory banks is arbitrary.

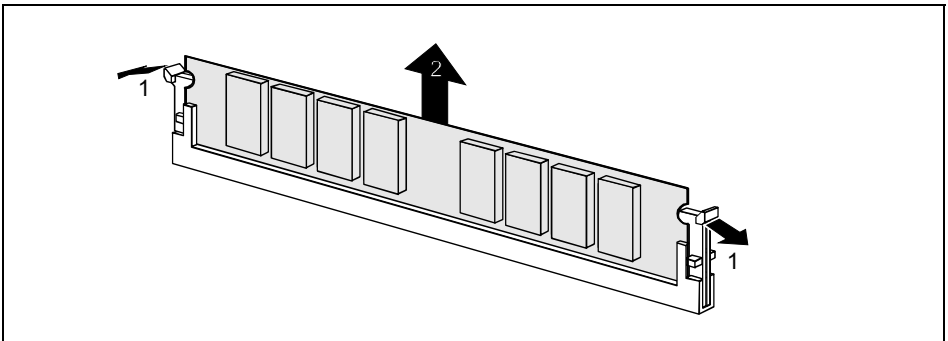


You may only use registered DDR DIMM memory modules. Unbuffered memory modules are not permitted.

DDR DIMM memory modules must be designed for a clock frequency of 266 MHz (meets PC2100 specification).

Installing a memory module

- ▶ Push the holders on each side of the memory slot outwards.
- ▶ Insert the memory module in the slot while folding the side holders up until the memory module engages (2).

Removing a memory module

- ▶ Push the clips on the right and left of the memory slot outward (1).
- ▶ Pull the memory module out of the memory slot (2).

Replacing lithium battery

In order to permanently save the system information, a lithium battery is installed to provide the CMOS-memory with a current. A corresponding error message notifies the user when the charge is too low or the battery is empty. The lithium battery must then be replaced.



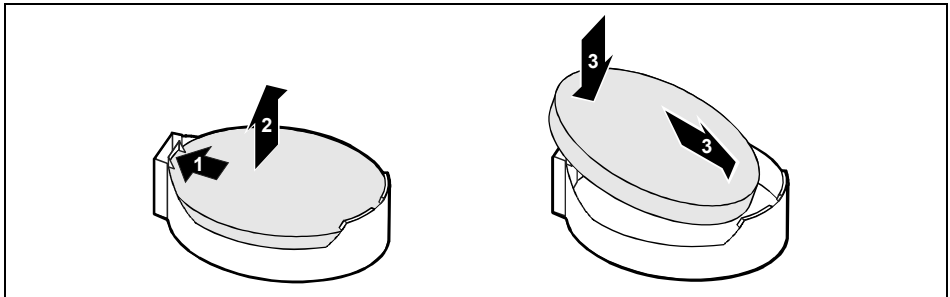
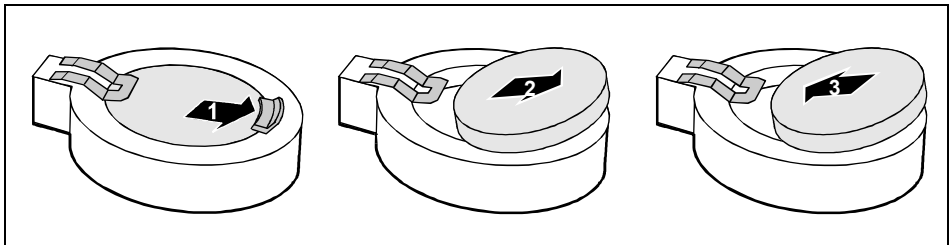
Incorrect replacement of the lithium battery may lead to a risk of explosion!

The lithium battery may be replaced only with an identical battery or with a type recommended by the manufacturer.

Do not throw lithium batteries into the household waste. They must be disposed of in accordance with local regulations concerning special waste.

Make sure that you insert the battery the right way round. The plus pole must be on the top!

The lithium battery holder exists in different designs that function in the same way.



- ▶ Press the locking lug in the direction of the arrow (1); the battery jumps somewhat out of the holder (2).
- ▶ Remove the battery (2).
- ▶ Insert a new lithium battery of the same type into the socket (3).

Glossary

The technical terms and abbreviations given below represent only a selection of the full list of common technical terms and abbreviations.

Not all technical terms and abbreviations listed here are valid for the described mainboard.

ACPI	Advanced Configuration and Power Management Interface
AC'97	Audio Codec '97
AGP	Accelerated Graphics Port
AMR	Audio Modem Riser
AOL	Alert On LAN
APM	Advanced Power Management
ATA	Advanced Technology Attachment
BIOS	Basic Input Output System
CAN	Controller Area Network
CPU	Central Processing Unit
CNR	Communication Network Riser
C-RIMM	Continuity Rambus Inline Memory Module
DIMM	Dual Inline Memory Module
ECC	Error Correcting Code
EEPROM	Electrical Erasable Programmable Read Only Memory
FDC	Floppy disk controller
FIFO	First-In First-Out
FSB	Front Side Bus
FWH	Firmware Hub
GMCH	Graphics and Memory Controller Hub
GPA	Graphics Performance Accelerator
I ² C	Inter Integrated Circuit
IAPC	Instantly Available Power Managed Desktop PC Design
ICH	I/O Controller Hub
IDE	Intelligent Drive Electronics
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
IPSEC	Internet Protocol Security

ISA	Industrial Standard Architecture
LAN	Local Area Network
LSA	LAN Desk Service Agent
MCH	Memory Controller Hub
MMX	MultiMedia eXtension
NMI	Non Maskable Interrupt
P64H	PCI64 Hub
PCI	Peripheral Component Interconnect
PXE	Preboot eXecution Environment
RAID	Redundant Array of Inexpensive Disks
RAM	Random Access Memory
RAMDAC	Random Access Memory Digital Analogue Converter
RDRAM	Rambus Dynamic Random Access Memory
RIMM	Rambus Inline Memory Module
RSB	Remote Service Board
RTC	Real Time Clock
SB	Soundblaster
SDRAM	Synchronous Dynamic Random Access Memory
SGRAM	Synchronous Graphic Random Access Memory
SIMD	Streaming Mode Instruction (Single Instruction Multiple Data)
SMBus	System Management Bus
SVGA	Super Video Graphic Adapter
USB	Universal Serial Bus
VGA	Video Graphic Adapter
WOL	Wake On LAN
ZCR	Zero Channel RAID